MAR 9 1988

FEMA 289 360120

FLOOD INSURANCE STUDY

TOWN OF OWASCO, NEW YORK
CAYUGA COUNTY

MAY 4, 1988

Federal Emergency Management Agency

COMMUNITY NUMBER - 360120

ORIGINAL

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance study purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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FLOOD INSURANCE STUDY
TOWN OF OWASCO, CAYUGA COUNTY, NEW YORK

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study revises and updates a previous Flood Insurance Study/Flood Insurance Rate Map for the Town of Owasco, Cayuga County, New York. This information will be used by the Town of Owasco to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (NFIP). The information will also be used by local and regional planners to further promote sound land use and floodplain development.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses in this study present a revision of the original analyses prepared for the Federal Emergency Management Agency (FEMA).

The hydrologic and hydraulic analyses for this updated study were prepared by the U. S. Geological Survey (USGS) for FEMA under Inter-Agency Agreement No. EMW-85-E-1823, Project Order No. 19. This work was completed in April 1986.

1.3 Coordination

On March 15, 1985, an initial Consultation and Coordination Officer's (CCO) meeting was held with representatives of the Town of Owasco, FEMA, the New York State Department of Environmental Conservation (NYSDEC), and the USGS (the study contractor) to identify streams in the community requiring detailed study.

Results of the hydrologic analyses were coordinated with town officials; the City of Auburn; the Cayuga County Planning Board; and the U. S. Department of Agriculture, Soil Conservation Service (SCS). On April 10, 1986, an intermediate meeting was held with representatives of the town, the general public, and the study contractor to present provisional information on flood elevations and delineations, and to identify problems.

On May 27, 1987, a final CCO meeting was held with representatives of the town, FEMA, and the study contractor to review the results of the study.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Town of Owasco, Cayuga County, New York. The area of study is shown on the Vicinity Map (Figure 1).

The following flooding sources were studied by detailed methods: Sucker Brook, from its confluence with Owasco Lake to approximately 0.5 mile upstream of the confluence; Dutch Hollow Brook, from its confluence with Owasco Lake to approximately 0.7 mile upstream of the confluence; and Owasco Outlet, from the downstream corporate limits to its confluence with Owasco Lake. Owasco Lake was also studied by detailed methods along its entire shoreline within the community. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction through April 1991.

Portions of Sucker Brook and Dutch Hollow Brook were studied by approximate methods. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and the Town of Owasco.

2.2 Community Description

The Town of Owasco is located in central Cayuga County in west-central New York. It is bordered by the Town of Sennett to the north, the Town of Skaneateles to the east, the Town of Niles to the south, the Town of Fleming to the west, and the City of Auburn to the northwest.

Sucker Brook and Dutch Hollow Brook flow west from the eastern corporate limits into Owasco Lake. Owasco Outlet flows north out of Owasco Lake into the City of Auburn.

2.3 Principal Flood Problems

Flood problems in the Town of Owasco are due primarily to overflow of Sucker Brook and Dutch Hollow Brook, and flooding along Owasco Outlet and the shoreline of Owasco Lake.

Flooding may occur during any season of the year. Most major floods have occurred during March, April, and June; the early spring floods are usually the result of spring rains and snowmelt. In addition, floods on Sucker Brook and Dutch Hollow Brook are occasionally

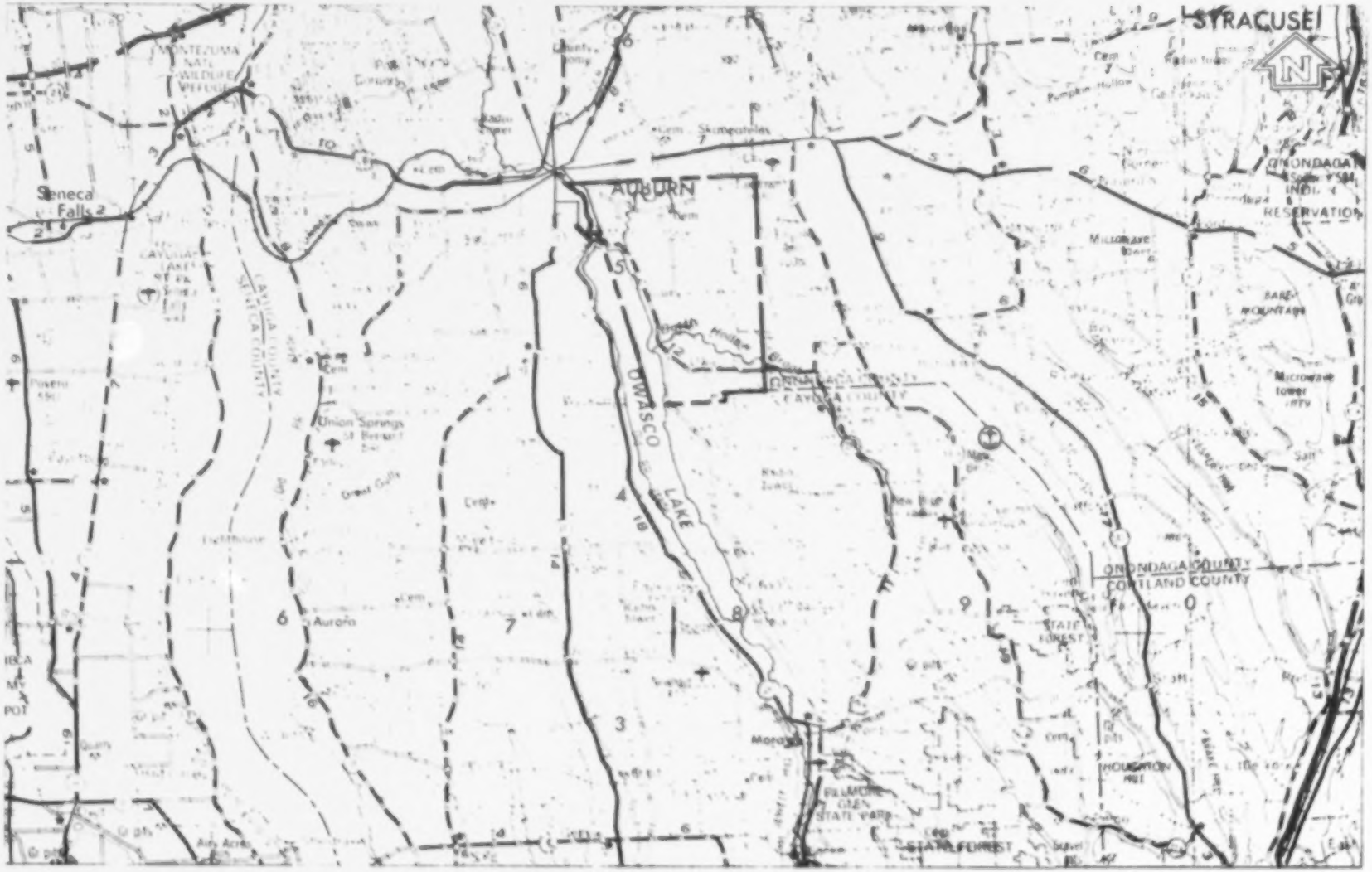


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF OWASCO, NY
(CAYUGA CO.)

APPROXIMATE SCALE

4 0 4 8 12 MILES

VICINITY MAP

aggravated by ice jams. Floods occurring during the summer months are often associated with tropical storms moving up the Atlantic coastline. Due to the extensive surface area of Owasco Lake, flooding in Owasco Outlet becomes a problem only during extremely severe, long-duration rainfalls. An example of this occurred during Tropical Storm Agnes in June 1972.

The largest floods recorded on Owasco Lake as determined at the water intake and pumping station, 1 mile south of the City of Auburn occurred in 1936 and in 1940. The maximum elevation of both floods was 716.91 feet. The flood of June 25, 1972 reached an elevation of 716.88 feet. These floods have a recurrence interval of 45 years or approximately a 2.2 percent chance of occurring in any given year.

2.4 Flood Protection Measures

The State Dam provides flood protection up to the 100-year flood on Owasco Outlet in the City of Auburn and adjoining portions of the Town of Owasco (Reference 1). There are no proposed additional flood control structures in the Town of Owasco.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. A flood event of a magnitude which is expected to be equaled or exceeded once on the average during any 100-year period (recurrence interval) has been selected as having special significance for floodplain management and for flood insurance rates. This event, commonly termed the 100-year floods, has a 1 percent chance of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each flooding source studied in detail affecting the community.

The magnitude of the 100-year flood for the 0.5 mile reaches of Sucker Brook and Dutch Hollow Brook were estimated using equations developed by Zembrzuski and Dunn for estimating magnitude and frequency of floods on rural unregulated streams in New York (Reference 2). The regression equation for the 100-year flood for the western flood-frequency region of New York is:

$$Q_{100} = 49{,}900\ A^{.733}(St + 10)^{-2.03}$$

Where Q_{100} is the flood discharge for the 100-year recurrence interval, A is the drainage area in square miles upstream from the site of interest, and St is the percentage of total drainage area shown as lakes, ponds, and swamps.

Drainage area and storage were determined from USGS topographic maps at a scale of 1:24,000 with a contour interval of 10 feet (Reference 3). The aforementioned equation was used to estimate the 100-year peak discharge at the upstream and downstream limits of the study reaches.

The magnitude of the 100-year flood for Owasco Outlet was interpolated from the Flood Insurance Study for the City of Auburn (Reference 1).

A summary of the drainage area-peak discharge relationships for the streams studied by detailed methods is shown in Table 1, "Summary of Discharges."

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGE (cfs) 100-YEAR
SUCKER BROOK		
At mouth	9.54	590*
Approximately 0.5 mile upstream of State Route 38A	9.46	580*
DUTCH HOLLOW BROOK		
At mouth	29.8	4,600
At upstream limit of study	29.8	4,600
OWASCO OUTLET		
Downstream of downstream corporate limits	205.4	2,813

*The Sucker Brook watershed has a high (10 percent) storage coefficient that greatly reduces peak discharge.

A stage frequency analysis was made for Owasco Lake using 45 years of lake level record from 1940 to 1984 and was adjusted historically to the period 1912 to 1984 based on data collected by the City of Auburn. This frequency analysis indicates the 100-year lake elevation taken at the gaging station at the State Dam to be 717.50 feet. The maximum elevation for the published period of record (1968 to 1984) is 716.88 feet in June 1972. Extremes outside this period indicate that since 1912 the lake reached a maximum elevation of 716.91 feet in March 1936 and again in April 1940.

The stillwater elevation for the 100-year flood has been determined for Owasco Lake and is summarized in Table 2, "Summary of Stillwater Elevations."

TABLE 2 - SUMMARY OF STILLWATER ELEVATIONS

FLOODING SOURCE AND LOCATION	ELEVATION (feet) 100-YEAR
OWASCO LAKE	
Entire shoreline within corporate limits	717.50

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Three different analytical methods were used to estimate elevations of the 100-year flood for the streams studied by detailed methods: a step-backwater analysis, a depth-frequency analysis, and profile interpolation. Approximately 0.5 mile reaches extending upstream from Owasco Lake were studied on both Sucker Brook and Dutch Hollow Brook. A step-backwater analysis through three bridges on Sucker Brook and one bridge on Dutch Hollow Brook was used along with a depth-frequency analysis of the reaches upstream from the bridges. A 1.9 mile reach of Owasco Outlet extending downstream from Owasco Lake to the corporate limits and the shoreline of Owasco Lake within the corporate limits were studied using profile interpolation methods.

For the step-backwater analysis of Sucker Brook, five cross sections were obtained from a field survey and one was synthesized. Structural geometry and elevations for three bridges and two road sections were also obtained from the field survey. For the step-backwater analysis of Dutch Hollow Brook, three cross sections were obtained from a field survey and three were synthesized.

Structural geometry and elevations for one bridge section were also obtained from the field survey. All synthesized cross sections were estimated from adjacent survey sections and contours from topographic maps at a scale of 1:24,000 with a contour interval of 10 feet (Reference 3). Cross sections were located above and below bridges in order to compute the backwater effects of these structures.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1) and the Flood Insurance Rate Map (Exhibit 2) where applicable.

Water surface elevations for the 100-year flood through the bridges on Sucker Brook and Dutch Hollow Brook were computed using a USGS J635 step-backwater computer program (Reference 4). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals.

The depth of the 100-year flood for reaches above the bridges on Sucker Brook and Dutch Hollow Brook was determined from an analysis of 100-year flood depths of gaged streams in the upstate New York river basins (Reference 5). The analysis related the difference between the depth of the median flow (50 percent duration) and 100-year flood with the drainage area of the basin.

Low-water profiles were surveyed for all depth-frequency study reaches. These elevations were used as the median (50 percent duration) discharge elevations and the flood depths from the depth-drainage area relations were added to these values to obtain the 100-year flood profile.

Water surface elevations on Owasco Outlet were obtained from the Flood Insurance Study for the City of Auburn and then by interpolation to the 100-year elevation of Owasco Lake (Reference 1).. Starting water-surface elevations for Sucker Brook and Dutch Hollow Brook were calculated using the slope/area method. Starting water-surface elevations for Owasco Outlet were obtained from the Flood Insurance Study for the City of Auburn (Reference 1).

Channel roughness factors (Manning's "n") used in hydraulic computations were chosen based on field observations of the stream and floodplain areas. Channel "n" values for Sucker Brook ranged from 0.035 to 0.045, and the overbank "n" values ranged from 0.060 to 0.090. The channel "n" values for Dutch Hollow Brook ranged from 0.035 to 0.045, and the overbank "n" values ranged from 0.060 to 0.090. The channel "n" values for Owasco Outlet ranged from 0.010 to 0.030, and the overbank "n" values ranged from 0.030 to 0.060.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps; the descriptions of the marks are presented in Elevation Reference Marks (Exhibit 3).

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100-year floodplain boundaries to assist communities in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. For the streams studied in detail, the 100-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. The 100-year floodplain boundaries for Sucker Brook and Dutch Hollow Brook have been delineated from flood information obtained from the USGS (Reference 5). Between cross sections, the boundaries for Owasco Outlet were interpolated using topographic maps at a scale of 1:24,000 with a contour interval of 10 feet (Reference 3).

For the streams studied by approximate methods, the 100-year flood boundaries were delineated from the Flood Hazard Boundary Map for the Town of Owasco (Reference 6).

The 100-year floodplain boundaries are shown on the Flood Insurance Rate Map (Exhibit 2). On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A and AE). Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent

floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. Portions of the floodway widths for Owasco Outlet extend beyond the corporate limits.

The floodway presented in this study was computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections (Table 3). The computed floodway is shown on the Flood Insurance Rate Map (Exhibit 2). In cases where the floodway and 100-year floodplain boundaries are either close together or collinear, only the floodway boundary is shown. Portions of the floodway widths for Owasco Outlet extend beyond the corporate limits.

No floodways were calculated as part of this study. The floodway for Owasco Outlet was taken from the Flood Insurance Study for the City of Auburn (Reference 1).

The area between the floodway and 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 2.

5.0 INSURANCE APPLICATION

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH[2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Owasco Outlet								
A	860	100	582	4.85	696.0	696.0	696.4	0.4
B	1,680	134	683	4.13	697.4	697.4	697.7	0.3
C	2,160	110	256	11.03	699.9	699.9	699.9	0.0
D	2,980	90	1,583	1.78	715.9	715.9	715.9	0.0
E	3,130	228	2,090	1.35	716.1	716.1	716.1	0.0
F	4,530	103	898	3.14	716.3	716.3	716.3	0.0
G	5,950	168	1,243	2.26	716.7	716.7	716.8	0.1

[1]Feet above corporate limits

[2]This width extends beyond corporate limits

TABLE 3

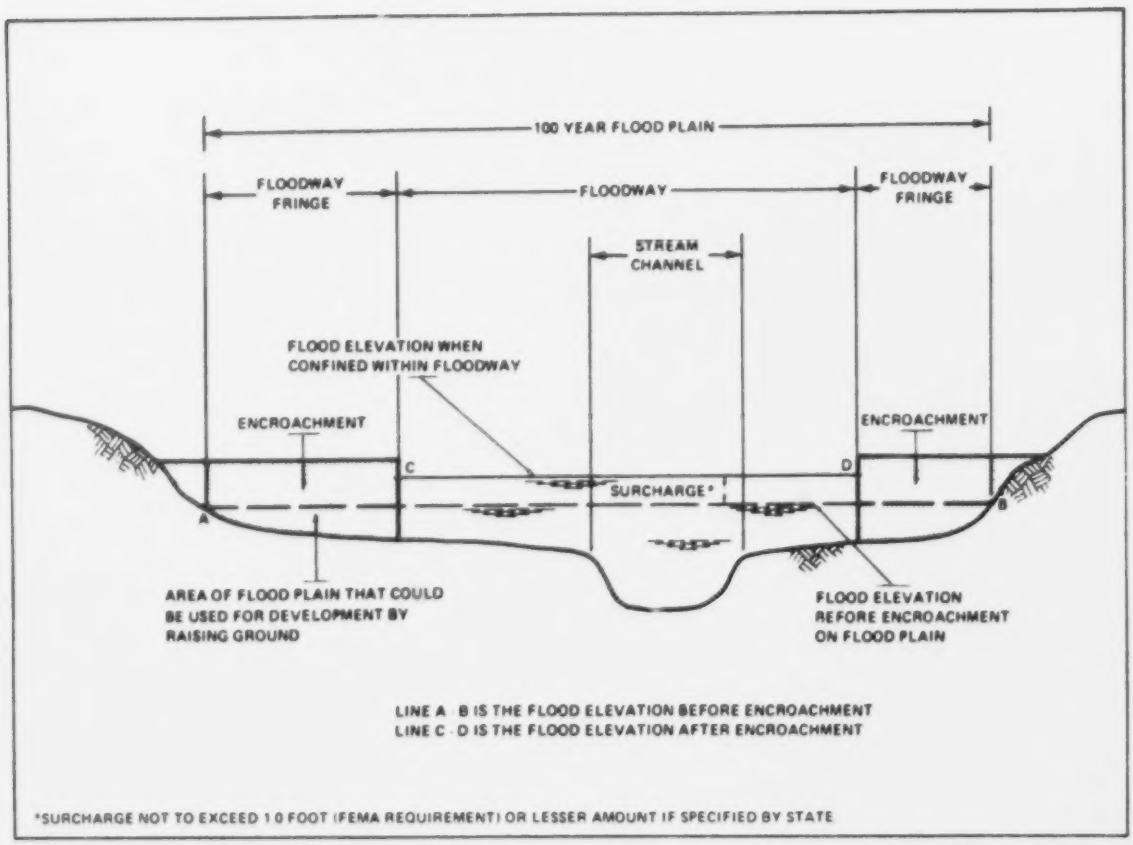
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF OWASCO, NY

(CAYUGA CO.)

FLOODWAY DATA

OWASCO OUTLET


100 YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE A B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C D IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE

FLOODWAY SCHEMATIC Figure 2

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the detailed hydraulic analyses are shown within this zone.

Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 100-year floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or depths are shown within this zone.

Zone V

Zone V is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no base flood elevations are shown within this zone.

Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year floodplain, areas within the 500-year floodplain, and to areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 100-year floodplain. The locations of selected cross sections used in the hydraulic analyses are shown where applicable.

7.0 OTHER STUDIES

Flood Insurance Studies have been published for the Towns of Skaneateles, Niles, Sennett, and Fleming, and the City of Auburn (References 7, 8, 9, 10, and 1). The results of this study are in complete agreement with the results of those studies.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting FEMA, the Natural and Technological Hazards Division, 26 Federal Plaza, Room 1351, New York, New York 10278.

9.0 BIBLIOGRAPHY AND REFERENCES

1. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, City of Auburn, Cayuga County, New York, Washington, D. C., March 2, 1981.

2. U. S. Department of the Interior, Geological Survey, Water Resources Investigations 79-83, Techniques for Estimating Magnitude and Frequency of Floods on Rural Unregulated Streams in New York State Excluding Long Island, by T. J. Zembrzuski and Bernard Dunn, Washington, D. C., 1979.

3. U. S. Department of the Interior, Geological Survey, 7.5-Minute Series Topographic Maps, Scale 1:24,000, Contour Interval 10 Feet: Auburn, New York, 1981, Photorevised 1978; Scipio Center, New York, 1981.

4. U. S. Department of the Interior, Geological Survey, Computer Program J635, User's Guide, Step-backwater and Floodway Analysis, Washington, D. C., 1977.

5. Richard Lumia, U. S. Department of the Interior, Geological Survey, Written Communication (Unpublished Report).

6. Federal Emergency Management Agency, Flood Hazard Boundary Map, Town of Owasco, Cayuga County, New York, February 6, 1984.

7. Federal Emergency Management Agency, Flood Insurance Study, Town of Skaneateles, Onondaga County, New York, Washington, D. C., June 1, 1982.

8. Federal Emergency Management Agency, Flood Insurance Study, Town of Niles, Cayuga County, New York, Washington, D. C., February 6, 1984.

9. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, Town of Sennett, Cayuga County, New York, Washington, D. C., June 22, 1979.

10. Federal Emergency Management Agency, Flood Insurance Study, Town of Fleming, Cayuga County, New York, Washington, D. C., February 27, 1984.

U. S. Department of the Interior, Geological Survey, Open-File Report 76-499, Computer Program E431, User's Manual, Computer Applications for Step-backwater and Floodway Analysis, J. O. Shearman, 1976.

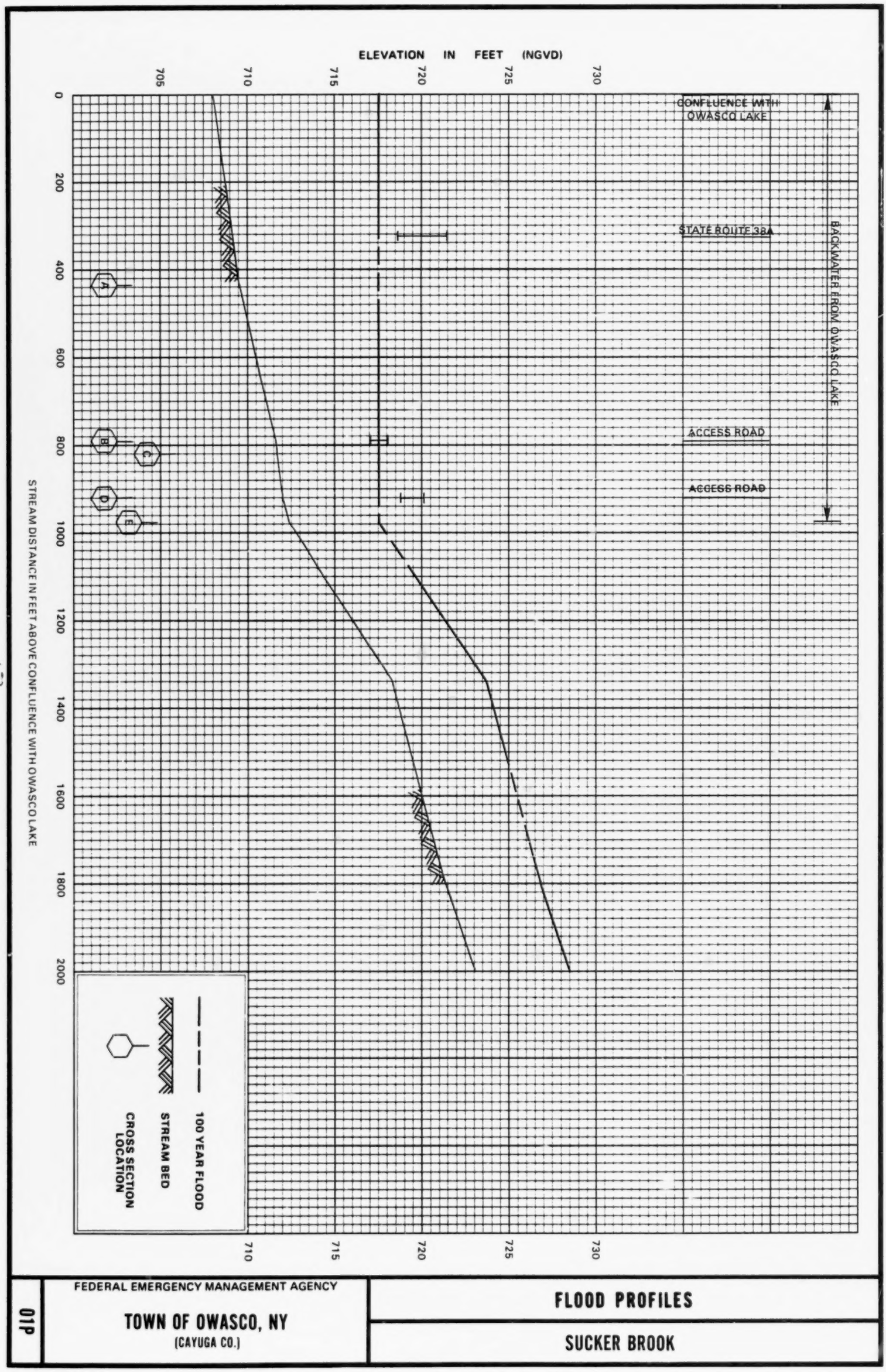
EXHIBIT 3 - ELEVATION REFERENCE MARKS

Reference Mark	Elevation (Feet NGVD)	Description of Location
RM 1*	741.00	Centerline of two walks, located south side of Owasco Street, approximately 160 feet east of intersection of Owasco Street and Lake Avenue.
RM 2	731.94	Standard disk stamped H 165 1942 set horizontally in middle of east headwall of concrete road culvert, located from post office at Auburn 0.5 mile northeast along Genesee Street to Owasco Street, then south 2.2 miles along State Route 38A, 300 feet north of centerline of White Bridge Road.
RM 3	719.21	Middle of downstream bridge pier at center downstream side of bridge, located 3.1 miles southeast on State Route 38A from junction of U. S. Route 20 and State Route 38A, on second bridge 600 feet upstream of State Route 38A bridge over Sucker Brook.
RM 4	721.28	Top of left upstream abutment at intersection with wing wall, located 3.1 miles southeast on State Route 38A from junction of U. S. Route 20 and State Route 38A, on State Route 38A bridge over Sucker Brook.
RM 5	724.22	Standard disk, stamped D 177 1959, set in top of concrete post 5 inches below ground, located 3.2 miles southeast of State Route 38A from junction of U. S. Route 20 and State Route 38A, set 1 foot east of right-of-way and 5 feet north of New York State Electric and Gas Pole No. 38.

*Located outside corporate limits - not shown on maps

EXHIBIT 3 - ELEVATION REFERENCE MARKS - continued

Reference Mark	Elevation (Feet NGVD)	Description of Location
RM 6	734.19	Top of downstream bolt holding left downstream end of bridge railing, located 6.1 miles southeast on State Route 38A from junction of U. S. Route 20 and State Route 38A, on State Route 38A bridge over Dutch Hollow Brook.
RM 7	795.87	Standard disk, stamped A 177 1959, set in top of concrete post 4 inches above ground, located 6.4 miles southeast on State Route 38A from junction of U. S. Route 20 and State Route 38A, set on north side of road opposite a combination gas station and grocery store, northeast of side road intersection, 1.0 foot north of right-of-way on fence line of property of white two story frame house.



FEDERAL EMERGENCY MANAGEMENT AGENCY

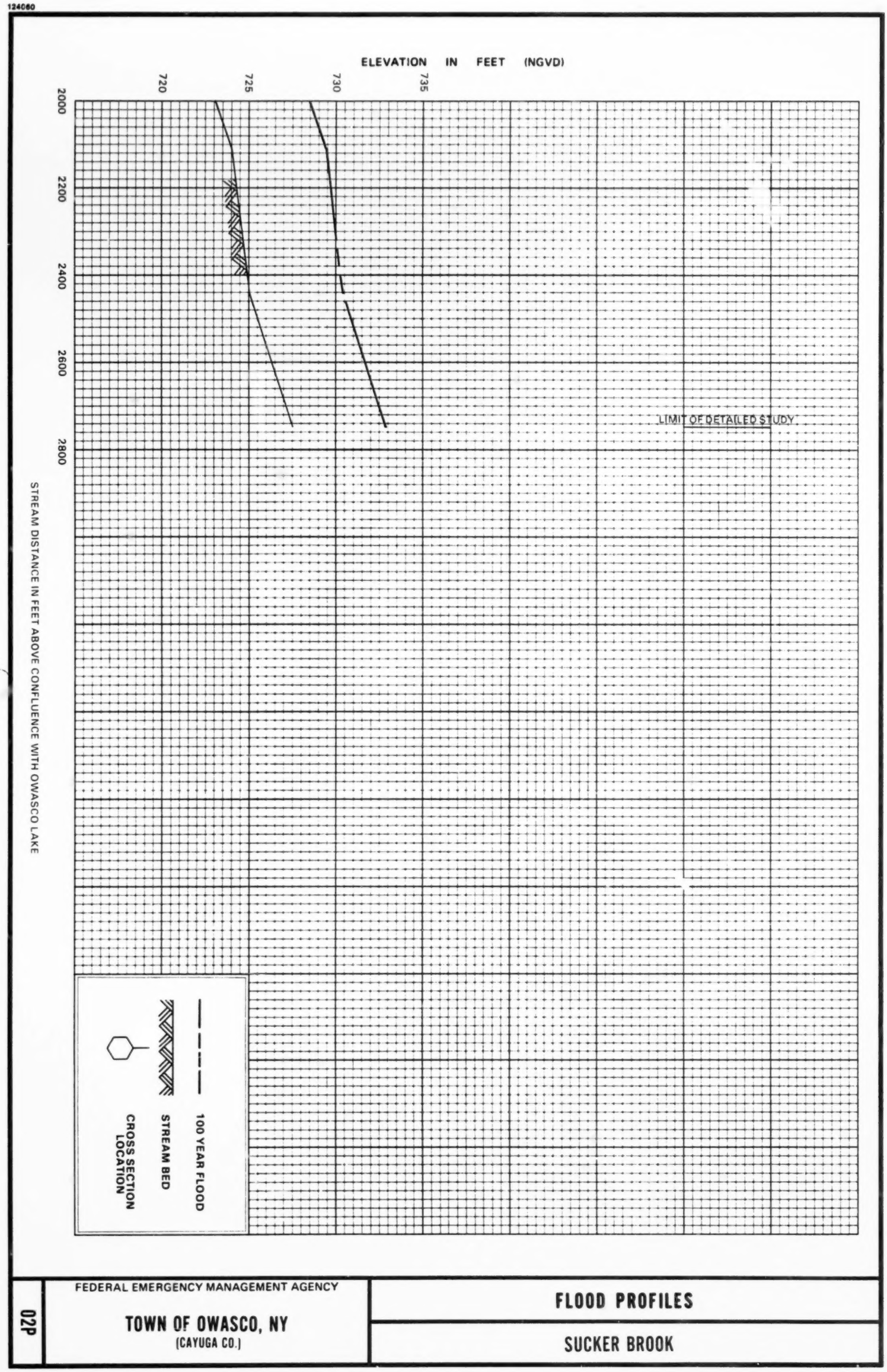
TOWN OF OWASCO, NY
(CAYUGA CO.)

FLOOD PROFILES

SUCKER BROOK

01P

124060



02P

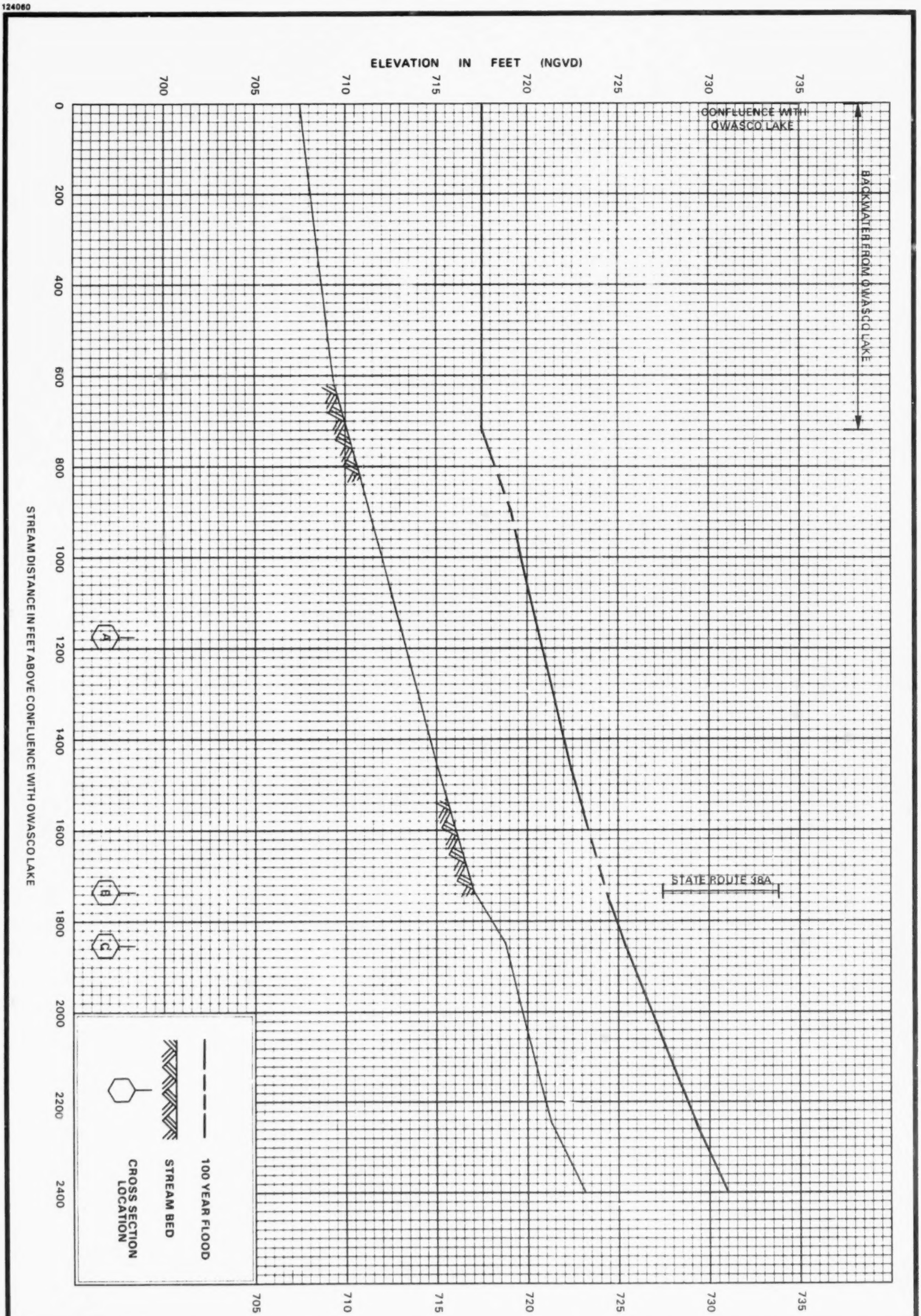
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF OWASCO, NY
(CAYUGA CO.)

FLOOD PROFILES

SUCKER BROOK

124060



19

03P

FEDERAL EMERGENCY MANAGEMENT AGENCY

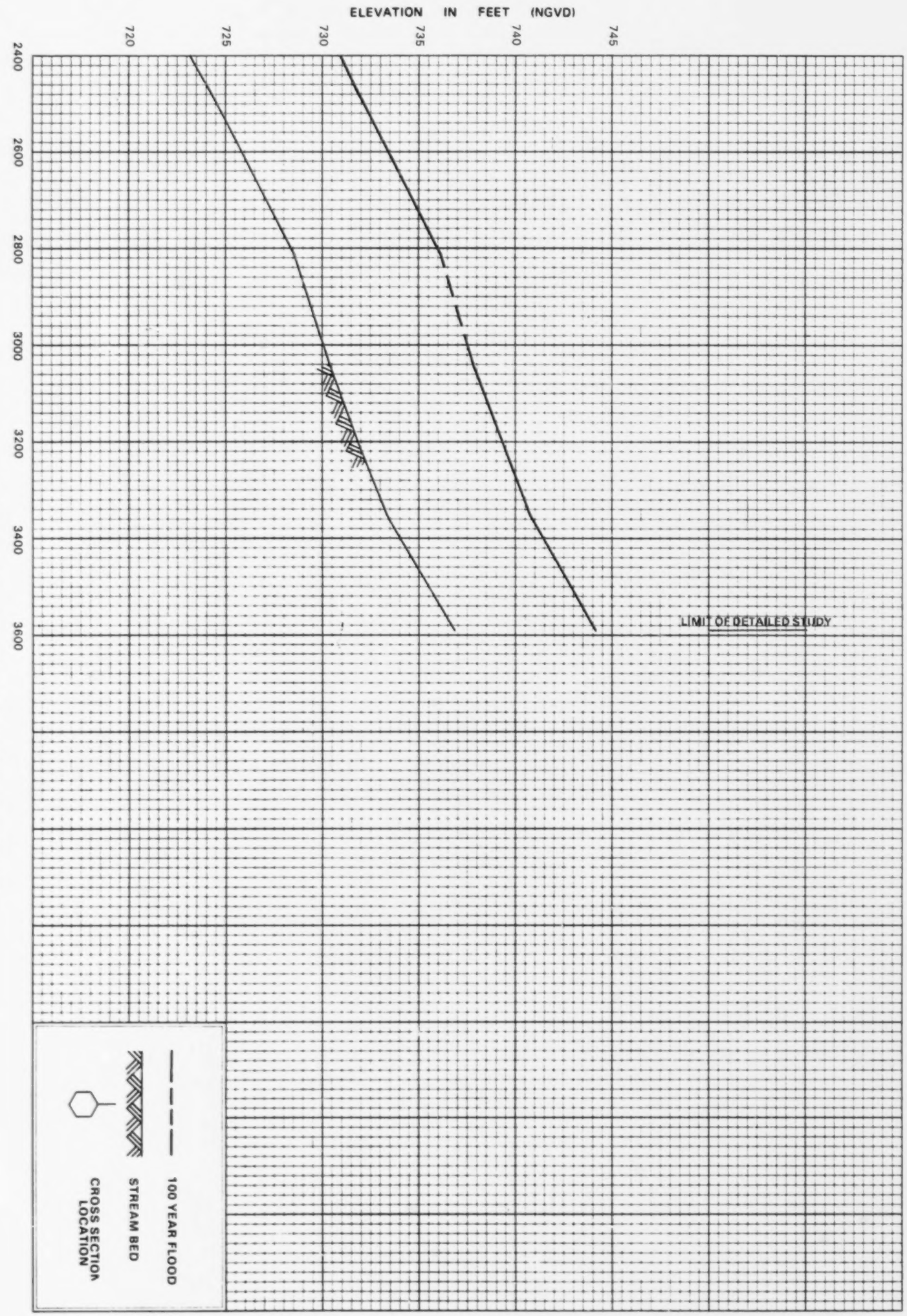
TOWN OF OWASCO, NY

(CAYUGA CO.)

FLOOD PROFILES

DUTCH HOLLOW BROOK

124060



04P

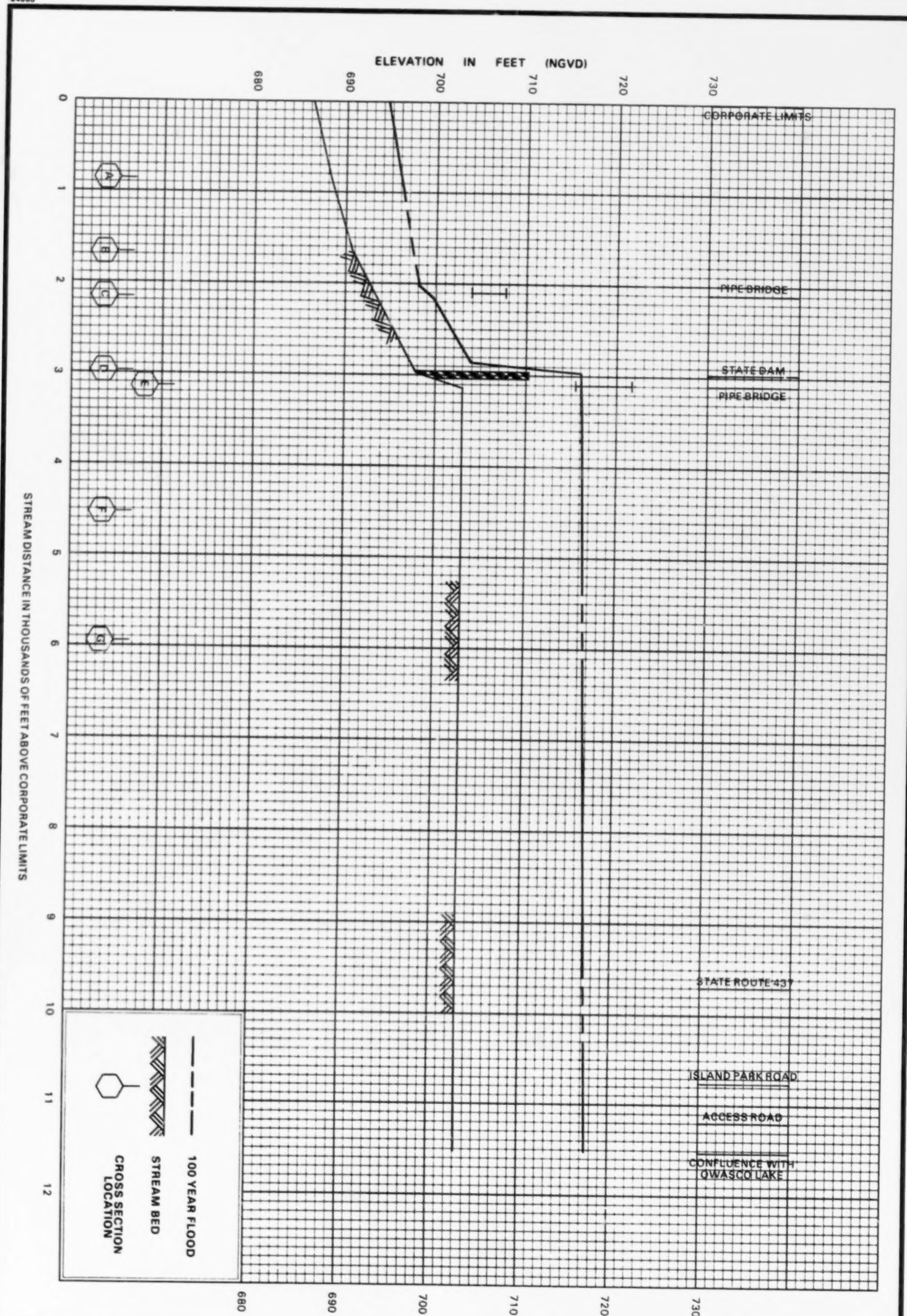
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF OWASCO, NY
(CAYUGA CO.)

FLOOD PROFILES

DUTCH HOLLOW BROOK

24080



FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF OWASCO, NY
(CAYUGA CO.)

05P

FLOOD PROFILES

OWASCO OUTLET